

REMARKS

Claims 1-14, 16-22 and 26-29 are pending in this application. By this Amendment, claims 1 and 26 are amended. The amendment introduces no new matter. Claims 15, 23 and 24 are canceled without prejudice to, or disclaimer of, the subject matter recited in those claims. Reconsideration of the application based on the above amendments and the following remarks is respectfully requested.

Claims 15, 23 and 24 were previously withdrawn as drawn to a non-elected species. Claims 15, 23 and 24 are canceled.

The Office Action, in paragraph 10, indicates that claims 7-10, 18 and 19 recite allowable subject matter. Specifically, the Office Action indicates that these claims would be allowable if rewritten in independent form to include the features of the base claim and any intervening claims. Applicant appreciates this indication of allowability, but respectfully submits that at least claim 1, from which these claims directly or indirectly depend, is allowable for the reasons set forth below.

The March 29, 2006 Office Action is identified as being a final rejection in the Office Action Summary, but the body of the Action does not assert finality. In an April 4, 2006 brief telephone interview, Examiner Gimie confirmed that the March 29 Action is not final. Applicant, therefore, understands that entry and consideration of the above-indicated claim amendments requires no further action on Applicant's part.

The Office Action, in paragraph 2, rejects claims 1-6, 11-17, 20 and 26-29 under 35 U.S.C. §103(a) over U.S. Patent No. 4,414,940 to Loyd in view of U.S. Patent No. 5,365,902 to Hsu; and in paragraph 3, rejects claims 21 and 22 under 35 U.S.C. §103(a) over Loyd in view of U.S. Patent No. 6,651,432 to Gray. Applicant understands that, because claims 21 and 22 depend from claim 1, the rejection of these claims relies on Hsu in combination with these references as well. These rejections are respectfully traversed.

Regarding claim 1, the Office Action asserts that Loyd teaches all of the features with the exception of the second fuel being different from the first fuel. This assertion is incorrect for at least the following reasons. The Office Action attempts to equate the main ignition nozzle 38 of Loyd with the first fuel-air mixture production module. However, the main injection nozzle 38 does not produce a fuel air mixture that avoids auto ignition. On the contrary, Loyd specifically states that the main fuel spray 44 from main fuel injection nozzle 38 auto-ignites upon entering the combustion chamber (see col. 6, lines 14-17).

The device disclosed in Loyd uses a igniter spark plug 40 to simultaneously ignite pilot fuel from a pilot injection nozzle 36 as it is injected into the combustion chamber. The device then injects a main fuel spray 44 from the main fuel injection nozzle 38. The main fuel spray 44 auto-ignites as it enters the combustion chamber.

Claim 1 recites, among other features, an ignition module that ignites the second fuel-air mixture after producing the first fuel-air mixture. Loyd teaches an ignition module that ignites the "second" fuel-air mixture before production of the "first" fuel-air mixture. As such, Loyd cannot reasonably be considered to teach, or to have suggested the combination of all of the features recited in claim 1, and recited in like manner in claim 26.

Neither of Hsu or Gray are applied in a manner to overcome this shortfall in the application of Loyd to the subject matter of the pending claims. Hsu, for example, discloses a diesel engine that has no corresponding ignition module. Hsu is relied on specifically as suggesting a main fuel, and a pilot fuel, which is more readily flammable than the main fuel.

As recognized in the Office Action, Loyd fails to disclose an internal combustion engine using a second fuel that is different from a first fuel, as recited in independent claims 1 and 26. The Office Action asserts that the deficiencies of Loyd are remedied because Hsu discloses the use of two different fuels. The Office Action further asserts that a person of

ordinary skill would have been motivated to modify Loyd with the teachings of Hsu in order to improve combustion of the main fuel.

One of ordinary skill would not have been motivated to modify Loyd to use the two different fuels of Hsu, and that the resulting combination would not have the features recited in independent claims 1 and 26. The Office Action assumes that a person of ordinary skill need only modify the Loyd system to use two different fuels and, after that modification, simply inject the two different fuels disclosed in Hsu. It is respectfully submitted that this analysis is simplistic and fails to appreciate how the fuels disclosed in Hsu interact. Hsu discloses the use of two fuels that are injected according to two specific methods that depend on the load conditions of the engine. Specifically, for high-load conditions, the Hsu main fuel is injected at a specific angle and, before the complete injection of the main fuel, a pilot fuel is then injected from the center of the combustion chamber and ignites immediately. See Hsu at col. 4, lines 43-47, and col. 5, lines 33-55. For low-load conditions, the order of injection is reversed because a fuel-air mixture cannot be formed and the main fuel must burn as soon as it enters the cylinder. See Hsu at col. 6, lines 11-15. Accordingly, the Hsu pilot fuel is injected first and ignites immediately, and the main fuel is then introduced and immediately burned. See Hsu at col. 6, lines 18-23. In order for a person of ordinary skill to modify the Loyd system to use the two fuels disclosed in Hsu, significant modifications would be required to the Loyd system that would change the principle of operation of the Loyd system, therefore rendering the asserted combination improper.

Also, there is no motivation to modify the Loyd system with the teachings of Hsu. There is no suggestion that the Hsu fuels will work in the Loyd system, or that the Loyd system (even if modified to handle two different fuels) would properly burn the Hsu fuels as directed in Hsu. The Office Action fails to provide support for its assertion that the

modification of Loyd with Hsu would be prompted by a purported improved combustion of the main fuel.

The conclusory statement of the Office Action is not enough to prove that there is a teaching, suggestion or motivation in the prior art to combine these references in the manner suggested by the Office Action. The Federal Circuit recently reaffirmed its prior holdings asserting that "rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, Appeal No. 04-1616, March 22, 2006 (Fed. Cir.) (quoting *In re Lee*, 277 F.3d 1338, 1343-46 (Fed. Cir. 2002), and *In re Rouffet*, 149 F.3d 1350, 1355-59 (Fed. Cir. 1998)).

MPEP §2143.01 instructs that "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." MPEP §2143.01 further instructs that "[a]lthough a prior art device 'may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so.'" *See also In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Applicant respectfully submits that the rejection of at least independent claim 1 is improper in view of at least MPEP §2143.01 because the Office Action lacks the required specific evidence of a teaching, suggestion or motivation in the prior art for one of ordinary skill to combine the references.

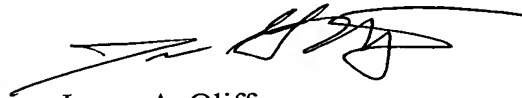
For at least these reasons, the applied prior art references cannot reasonably be considered to teach, or to have suggested, the combinations of all of the features recited in independent claims 1 or 26. Additionally, claims 2-14, 16-22 and 27-29 are also neither taught, nor would they have been suggested, by the applied prior art for at least the respective dependence of these claims directly or indirectly on independent claims 1 or 26, as well as for the separately patentable subject matter that each of these claims recites.

Accordingly, reconsideration and withdrawal of the rejections of claims 1-14, 16-22 and 26-29 over any combination of the applied prior art references are respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-14, 16-22 and 26-29 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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JAO:DAT

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